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DEBT FINANCING AND ENVIRONMENTAL SUSTAINABILITY DISCLOSURE OF LISTED OIL AND GAS FIRMS IN NIGERIA

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ABSTRACT

This study examined the effect of debt financing on environmental sustainability disclosure of listed oil and gas firms in Nigeria for a period of eleven (11) years covering from 2012-2022. Specifically, this study ascertained the effect of debt ratio, short term debt ratio and long term debt ratio on environmental remediation disclosure. Panel data were used in this study, which were obtained from the annual reports and accounts of ten (10) sampled listed oil and gas firms for the periods 2012-2022. Ex-Post Facto research design and content analysis was employed. Inferential statistics using Pearson correlation coefficient and Panel Least Square (PLS) regression analysis were applied to test the hypotheses of the study. The results revealed that debt ratio has a significant and negative effect on environmental remediation disclosure (β1 = -0.063575; p-value = 0.0000); short term debt ratio has a significant and positive effect on environmental remediation disclosure (β2 = 0.018174; p-value = 0.0000); long term debt ratio has a significant and positive effect on environmental remediation disclosure (β3 = 0.100742; p-value = 0.0000). In conclusion, the study upholds that debt finance significantly affects environmental sustainability disclosure of listed Oil and Gas firms in Nigeria at 5% level of significance. It was recommended amongst others that firms should lever on the amount of debt they undertake to finance their undertakings, as it enhances firms' bottom line. Also, that firms should operate with a capital structure mix that would minimize the cost of capital and reducing the reputational risks associated with the company's operations.

1. INTRODUCTION

To ensure long-term financial success, businesses need to recognize that they are operating within a larger biophysical and social environment, and respect the limits and processes governing the sustainability of the larger ecosystem as the global economy expands rapidly toward the carrying capacity of the planet. Consequently, firms, especially the large

multinational corporations, are being challenged to behave in an environmentally sustainable and socially responsive manner while maintaining and improving shareholder value. Stakeholders are soliciting information on the environmental and social impacts of business operations as well as on measures to benchmark corporate social and environmental performance indifferent industrial contexts, while investors demand disclosure of material environmental risks and related compliance costs and liabilities (Okudo, Mbonu, & Amahalu, 2022; Amahalu & Okudo, 2023). Firm managers continually seek information to improve the triple bottom line performance and to make informed trade-offs among often-conflicting financial, environmental, and social objectives. As a result, the accounting profession is being called upon to expand its traditional role to incorporate environmental and social performance into the financial reporting and management control systems. Debt financing refers to the act of borrowing funds from companies and investors through the use of bonds, banks, or financial institutions with refund obligation, in order to support a business's operations. The lender of such fund is repaid the total amount borrowed, plus the interest accumulated on it, at a later point in time (Adibeli & Amahalu, 2023). At the onset, many businesses do not have sufficient funds to operate, let alone sustain their operations. Hence, they decide to borrow, either from personal sources such as family and friends, as is common to small and medium scale enterprises (SMEs), or impersonal sources such as banks and other financial institutions, as is common with large firms. Several means of external financing exist, however, certain reasons exist which compel business owners to opt for debt financing. Funding through debts proves to be critical to business success as it ensures that the business owner is constantly conscious of running the business well so as to be able to pay back such debts. Also it can be less costly as interest paid on money borrowed for business activities are tax deductible (Mba, Mbonu & Amahalu, 2023). Debt financing instruments like bonds ease the pressure on bank lending, particularly longer-term lending, and allow a wider range of corporate credits to access investment markets and seek more finance than the banks or government agencies could provide. Debt financing takes many forms. The essence of debt is that the borrower must repay the funds along with agreed-upon service charges such as interest and loan origination fees (Amahalu, Okudo & Ezechukwu, 2023).

Environmental sustainability requires enterprises to invest more human, material and financial resources. Internal funds are usually used for daily business turnover, and most companies may not be financially capable to be responsibly involved in environmental sustainability activities if they only rely on internal funds, so the environmental sustainability

activities of enterprises mainly rely on external funds (Ndubuisi & Moedu, 2023). The key challenge of sustainability reporting is deciding who the audience is. The challenge is to think about how to use the reporting information gathered more flexibly, in order to meet the specific interests of different stakeholder groups in other to create value (Amahalu & Osonwa, 2023). In practice, however, and in the absence of a universally accepted approach to categorising all the components of the sustainability accounting, reporting organisations do not necessarily follow a particular reporting standard in relation to sustainability reporting.

Debt financing and its effect on performance have emerged as key areas for research in recent years. Various research studies have been performed over the last decade for examining this relationship. However, the results have been inconclusive, inconsistent, and often contradictory. It ranges from positive (Mbonu & Amahalu, 2023; Okafor, 2018) to negative (Okudo & Ndubuisi, 2023; Nguyen, Pham, Truong, Phi, Le & Vu, 2023) and even to non-significant relationship (Amahalu & Okudo, 2023). In the light of the foregoing, it is crystal clear that there exists a gap in knowledge, which this study tends to close.

1.1 Objectives of the Study

The main objective of the study is to examine the effect of debt financing on environmental sustainability disclosure of listed oil and gas firms in Nigeria.

The specific objectives of this study are to:

1. determine the effect of debt ratio on environmental remediation disclosure of listed oil and gas firms in Nigeria.
2. ascertain the effect of short term debt ratio on environmental remediation disclosure of listed oil and gas firms in Nigeria.
3. evaluate the effect of long term debt ratio on environmental remediation disclosure of listed oil and gas firms in Nigeria.

1.2 Hypotheses

Based on the objectives of the study, the following hypotheses were developed:

H_{o1}: Debt ratio has no significant effect on environmental remediation disclosure of listed oil and gas firms in Nigeria.

H_{o2}: Short term debt ratio has no significant effect on environmental remediation disclosure of listed oil and gas firms in Nigeria.

H_{o3}: Long term debt ratio has no significant effect on environmental remediation disclosure of listed oil and gas firms in Nigeria.

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2. LITERATURE REVIEW

2.1 Conceptual review

2.1.1 Debt Financing

Debt means the amount of money which needs to be repaid and financing means providing funds to be used in business activities. An important feature in debt financing is the fact that you are not losing ownership in the company. Debt financing is a time-bound activity where the borrower needs to repay the loan along with interest at the end of the agreed period. The payments could be made monthly, half yearly, or towards the end of the loan tenure (Amahalu & Okudo, 2023). Debt financing means when a firm raises money for working capital or capital expenditures by selling bonds, bills, or notes to individual and/or institutional investors. In return for lending the money, the individuals or institutions become creditors and receive a promise to repay principal and interest on the debt (Aruna, Oshiole & Ndubuisi, 2020).

2.1.2 Debt Ratio

Debt Ratio is a financial ratio that indicates the percentage of a company's assets that are provided via debt (Okudo, Mbonu & Amahalu, 2022). It is the ratio of total debt and total assets (the sum of current assets, fixed assets, and other assets such as goodwill (Hayes, 2022). Debt ratio is a solvency ratio that measures a firm's total liabilities as a percentage of its total assets. The debt ratio shows a company's ability to pay off its liabilities with its assets. In other words, this shows how many assets the company must sell in order to pay off all of its liabilities. This ratio measures the financial leverage of a company.

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

2.1.3 Short Term Debt Ratio

Short-term debt, also called current liabilities, is a firm's financial obligations that are expected to be paid off within a year. Short-term debt describes liabilities that are due to be paid within one year. A short-term debt ratio indicates the likelihood that a company will be able to deliver payments on its outstanding short-term liabilities (Chukwuka, Okegbe, Amahalu, & Obi, 2022). Short-term debts include liabilities with a repayment time frame of less than one year from initial issue (such as commercial paper) rather than the sum of all debt payments (final and interim) due within a coming 12-month period (Fernando, 2022).

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$$\text{Short Term Debt Ratio} = \frac{\text{Short Term Debt}}{\text{Total Assets}}$$

2.1.4 Long Term Debt Ratio

Long term debt ratio is the financial leverage ratios measuring the proportion of long-term debt used to finance the assets of a business. This ratio represents the position of the financial leverage the company's take. With this ratio, analysts can estimate the capability of the corporation to meet its long-term outstanding loans (Eze, Okoye, Ndubuisi & Obi, 2022). Long term debt ratio is a coverage or solvency ratio used to calculate the amount of a company's leverage.

$$\text{Long Term Debt Ratio} = \frac{\text{Long Term Debt}}{\text{Total Assets}}$$

2.1.5 Environmental Sustainability Disclosure

Environmental sustainability disclosure is the communication of environmental performance information by an organisation to its stakeholders (Mbonu & Ndubuisi, 2022). Information on environmental performance includes among others: impacts on the environment; performance in managing those impacts; and contribution to ecological and sustainable development (Oshiole, Elamah & Ndubuisi, 2020). Environmental reporting is the process by which management reports to the public about environmental impacts of business activities and environmental initiatives undertaken to mitigate them by disclosing the environmental information (Onoja, Okoye & Nwoye, 2021a; Onoja, Okoye & Nwoye, 2021b) related to those activities.

2.1.6 Environmental Remediation Disclosure

Environmental remediation disclosure means reporting all costs and expenses of actions or activities to cleaning up or removal of hazardous materials from the environment; preventing or minimizing the further movement, leaching or migration of hazardous materials in the environment; preventing, minimizing, or mitigating the release or threatened release of hazardous materials into the environment, or injury or damage from such release, and comply with the requirements of any environmental laws (Modozie & Amahalu, 2022). Environmental remediation costs include, without limitation, costs and expenses payable in connection with the foregoing for legal, engineering or other consultant services, for investigation, testing, sampling, and monitoring, for boring, excavation, and construction, for

removal, modification or replacement of equipment or facilities, for labor and material, and for proper storage, treatment, and disposal of hazardous materials (Udo, Oraka & Amahalu, 2022).

2.1.7 Debt Financing and Environmental Sustainability Disclosure

Debt structure decisions are among the most important finance decisions firms encounter. The debate still remains until the present day whether such decisions influence costs of capital and firm values (Mmaduka, Udeh, Ndubuisi, & Obi, 2022). The recent surge in the environmental, social, and governance (ESG) factors has highlighted many unanswered questions in the financial market world. Share holders and creditors may price ESG performance of firms depending on their incentives and objectives, which may be in the form of higher and less volatile cash flows, and also on the perceived risk of firms (Okafor, Egbunike & Amahalu, 2022). However, there is no consensus on the association between debt and sustainability performance. Some empirical research points to negative relationships between sustainability performance and cost of equity (Ekweozor, Ogbodo, & Amahalu, 2022). Contrarily, other studies find a positive relationship between both variables (Okudo & Ndubuisi,2021).

2.2 Theoretical Framework

This work derived theoretical support from Trade off Theory:

2.2.1 Trade-Off Theory

The trade-off theory of capital structure is the idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. The classical version of the hypothesis goes back to Kraus and Litzenberger (1973) who considered a balance between the dead-weight costs of bankruptcy and the tax saving benefits of debt. The trade-off theory predicts that there is an optimal level of capital structure for each firm derived from the tax benefits of debt and the financial distress costs that it creates. The trade-off theory states that firms with safe, tangible assets and plenty of profits to shield should be the ones with the highest leverage levels.

2.3 Empirical Review

Chang, Hsiou-Wei, Wen-Hsien, Wei-Liang Wang and Cheng-Tsu Huang (2021) studied the relationship between Taiwanese firms' corporate social responsibility (CSR) performance and financial outcome from 2011-2017. Multiple regression analysis was conducted to depict the

relationships. The results showed that a firm's CSR performance is negatively correlated with employee turnover and turnover variability.

Santos-Jaen and Serrano-Madrid (2021) examined the relationship between corporate social responsibility and firms' financial performance in Spain from 2016-2020. Multiple regression analysis was conducted to depict the relationships. The research found that competitive advantage significantly mediated the indirect impact of perceived CSR and disclosure on firms' financial performance.

Almustafa, Jabbouri and Kijkasiwat (2023) examined the effect of economic policy uncertainty (EPU) on firm-level investment and corporate financial leverage. The panel data of 1072 firms traded on the New York Stock Exchange (NYSE), New York Stock Exchange Market over the period 2012–2021 was analyzed using the fixed-effect model. The empirical results showed that the financial leverage of a firm is negatively affected by EPU.

Nguyen, Pham, Truong, Phi, Le and Vu (2023) examined the relationship between capital structure Vietnamese company's profitability. Regression model was used to test the data given by 300 Vietnamese firms for the period from 2012 to 2018. The findings indicated that firm profitability, represented by Return on Equity (ROE) and Return on Assets (ROA), was associated with liquidity and debt; there was a positive relationship between liquidity and profitability of Vietnamese entrepreneurs, while there was a negative relationship between long-term debt and profit maximization. Moreover, the short-term loan also has a positive impact on the firm's profitability.

3. MATERIAL AND METHOD

Ex-post facto research design was employed in this study. The population of the study consisted of all the twelve (12) Oil and Gas firms listed on the Nigerian Exchange (NGX) Group as at 31st December, 2022. They are: 11 Plc (formerly Mobil Plc), Anino International Plc; Capital Oil Plc; Conoil Plc; Eterna Plc; Forte Oil Plc; Japaul Oil & Maritime Services Plc ; MRS Oil Nigeria Plc; Oando Plc; Rak Unity Plc; Seplat Petroleum Development Company Plc; Total Nigeria Plc The sample size of this study comprised ten (10) listed Oil and Gas firms that have consecutively submitted their annual reports to the Nigerian Exchange (NGX) Group from 2012 to 2022. Purposive sampling technique was adopted to select the companies with up to date and complete annual reports and accounts for the study period (2012-2022). The criteria for the sample selection include: companies that publish their

annual reports and sustainability reports from 2012-2022, and as well as companies that have been actively trading consistently on the floor of the Nigerian Exchange (NGX) Group for the period of interest. They include: Anino International Plc; Capital Oil Plc; Conoil Plc; Eterna Plc; Japaul Oil & Maritime Services; MRS Oil Nigeria Plc; Oando Plc; Rak Unity Plc; Seplat Petroleum Development Company Plc; Total Nigeria Plc.The data to be used in this study were collected mainly from secondary source. These data were obtained from ten (10) years annual reports and account from 2012-2022 of the sample Oil and Gas firms.

Table 1 Operationalisation of Variables

Variables	**Definition**	**Measurement**
Independent Variables (Debt Financing)		
DR	Debt Ratio	Total Debt/Total Assets
STDR	Short Term Debt Ratio	Short Term Debt/Total Assets
LTDR	Long Term Debt Ratio	Long Term Debt/Total Assets
Dependent Variable (Environmental Sustainability Disclosure)		
ERD	Environmental Remediation Disclosure	Total Environmental Remediation Disclosure Score / Maximum Environmental Disclosure Score Possible for a Firm

Content analysis was adopted in this study. This study adopted the Global Reporting Initiative (GRI) framework disclosures according to the G4 guidelines for the purpose of developing the environmental sustainability disclosure indices. Environmental sustainability disclosure was evaluated by 21 indicators (refer to appendix A).

For each of these sustainability reports, all the 21 indicators were scored as follows:

i. a score of 0 for an item not referred to in a report;
ii. a score of 1 when the report only briefly mentioned something pertinent to the item or provided only qualitative statements;
iii. a score of 2 when the report provided detailed information with some numerical support; and rarely
iv. a score of 3 was given when a report provided extensive numerical support with data on goals achieved or fully accomplished.

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Therefore,

ESDI =TDP/MP……eqn 1.

Where;

ESDI = Environmental Sustainability Disclosure Index

TDP = Total Disclosure Points of a Firm

MP = Maximum Points for a Firm

Consequent upon the adapted model, the following multiple regression equation was constructed:

$ERD_{it} = \beta o + \beta_1 DR_{it} + \beta_2 STDR_{it} + \beta_1 LTDR_{it} + \mu_{it}$.....eqn2

Where:

β_o = Constant term (intercept)

β_{it} = Coefficients of Debt Financing estimated for firm í in period t

μ_{it} = Error term/unexplained variable(s) of firm í in period t

ERD_{it} = Environmental Remediation Disclosure of firm í in period t

DR_{it} = Debt Ratio of firm í in period t

$STDR_{it}$ = Short Term Debt Ratio of firm í in period t

$LTDR_{it}$ = Long Term Debt Ratio of firm í in period t

4. RESULT AND DISCUSSIONS

4.1 Data Analysis

Table 2 Pearson Correlation Matrix

	ERD	DR	STDR	LTDR
ERD	1.0000			
DR	0.0946	1.0000		
STDR	0.0606	0.5951	1.0000	
LTDR	0.5889	0.6439	0.0737	1.0000

Source: E-Views 10.0 output, 2023

From the findings on the correlation analysis in Table 2, it was found that there is a positive correlation between DR (0.0946); STDR (0.0606), LTDR (0.5889) and ERD.

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4.2 Test of Hypotheses

Table 3 Panel Least Square Regression Analysis testing the effect of Debt Financing on Environmental Sustainability Disclosure

Dependent Variable: ERD

Method: Panel Least Squares

Date: 03/17/24 Time: 15:26

Sample: 2012 2022

Periods included: 11

Cross-sections included: 10

Total panel (balanced) observations: 110

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018756	0.003420	-5.483886	0.0000
DR	-0.063575	0.006937	-9.164342	0.0000
STDR	0.018174	0.002681	6.777682	0.0000
LTDR	0.100742	0.007568	13.31094	0.0000

R-squared	0.651743	Mean dependent var	0.018199
Adjusted R-squared	0.640860	S.D. dependent var	0.010905
S.E. of regression	0.006535	Akaike info criterion	-7.184133
Sum squared resid	0.004100	Schwarz criterion	-7.079926
Log likelihood	363.2066	Hannan-Quinn criter.	-7.141958
F-statistic	59.88616	Durbin-Watson stat	2.273455
Prob(F-statistic)	0.000000		

Source: E-Views 10.0 Panel Regression Output, 2024

4.2.1 Regression Result

The generated panel least regression result in table 3 indicates that:

ERD = -0.018756 - 0.063575DR + 0.018174STDR + 0.100742LTDR

The implication of the regressed result is that taking all factors into account (DR, STDR and LTDR) as constant at zero, ERD will be -0.018756. The analyzed result also showed that taking all other independent variables at zero, a unit increase in DR will lead to 6.36% reduction in ERD while a unit increase in STDR and LTDR will respectively lead to 1.82%

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and 10.74% increase in ERD. The three independent variables that were studied, explained only 64.09% of the factors affecting ERD among listed oil and gas firms in Nigeria as represented by the adjusted R^2. This therefore means that other factors not studied in this research contribute about 35.91% influence on ERD of sampled firms.

4.2.1.1 Decision

On the whole, the overall significance value; Prob(F-statistic) = 0.000000 is less than the critical value of 5% (0.05), thus, inferring that the model is statistically significant in predicting how DR, STDR and LTDR relate with ERD of listed oil and firms in Nigeria at 5% level of significance. Thus, H_1 is accepted which upholds that debt finance indices has a significant influence on environmental sustainability disclosure of listed oil and gas firms in Nigeria from 2012-2022.

Based on the analysis of this study, the following findings were deduced:

i. Debt ratio has a significant and negative effect on environmental remediation disclosure of listed Oil and Gas firms in Nigeria at 5% level of significance (β_1 = -0.063575; p-value = 0.0000).
ii. Short term debt ratio has a significant and positive effect on environmental remediation disclosure of listed Oil and Gas firms in Nigeria at 5% level of significance (β_2 = 0.018174; p-value = 0.0000).
iii. Long term debt ratio has a significant and positive effect on environmental remediation disclosure of listed Oil and Gas firms in Nigeria at 5% level of significance (β_3 = 0.100742; p-value = 0.0000).

CONCLUSION AND RECOMMENDATIONS

In line with the conclusion of this study, the following suggestions were offered:

i. Based on the negative relationship between debt ratio and environmental sustainability disclosure, this study recommends that, firms should lever on the amount of debt they undertake to finance their undertakings, as it enhances firms' bottom line. Also, that firms should operate with a capital structure mix that would minimize the cost of capital and reducing the reputational risks associated with the company's operations.
ii. In order to sustain the positive relationship between short term debt and environmental sustainability disclosure, this study suggests that firms should continuously and judiciously use short-term debt in financing operations so as to improve and sustain their environmental performance.

iii. Government and/or lending institutions should design long term financing options suitable for firms such as credit and equity guarantees as well as industry-based credit facilities that will make long term credit not only available but also affordable in order to enable firms link improvements in social and environmental issues with financial opportunities.

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APPENDIX A

Environmental Disclosures in GRI G4

Disclosure	Description	Aspect
G4-EN1	Materials used by weight or volume	Materials
G4-EN3	Energy consumption within the organization	Energy
G4-EN4	Energy consumption outside the organization	Energy
G4-EN5	Energy intensity	Energy
G4-EN6	Reduction in energy consumption	Energy
G4-EN7	Reductions in energy requirements of products and services	Energy
G4-EN8	Total water withdrawal by source	Water
G4-EN11	Operational sites owned, leased, managed in, or adjacent to, protected areas and the areas of high biodiversity value outside protected areas	Biodiversity
G4-EN12	Description of the significant impacts of activities, products, and services on biodiversity in protected areas and the areas of high biodiversity value outside protected areas	Biodiversity
G4-EN13	Habitats protected or restored	Biodiversity
G4-EN15	Direct greenhouse gas (ghg) emissions (scope 1)	Emissions
G4-EN16	Energy indirect greenhouse gas (ghg) emissions (scope 2)	Emissions
G4-EN17	Other indirect greenhouse gas (ghg) emissions (scope 3)	Emissions
G4-EN18	Greenhouse gas (ghg) emissions intensity	Emissions
G4-EN19	Reduction in greenhouse gas (ghg) emissions	Emissions
G4-EN22	Total water discharge by quality and destination	Effluents and Waste
G4-EN27	Extent of the impact mitigation of the environmental impacts of products and services	Products and Services
G4-EN30	Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and the transporting members of the workforce	Transport
G4-EN31	Total environmental protection expenditures and investments by type	Overall
G4-EN32	Percentage of new suppliers that were screened using environmental criteria	Supplier Environmental Assessment
G4-EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken	Supplier Environmental Assessment

Source: G4 Sustainability Reporting Guidelines, Reporting Principles and Standard Disclosures, 2024.